

Inductive Reasoning: Developing Reliable Conclusions

"We can easily forgive a child who is afraid of the dark; the real tragedy of life is when [mature human beings] are afraid of the light."

Plato

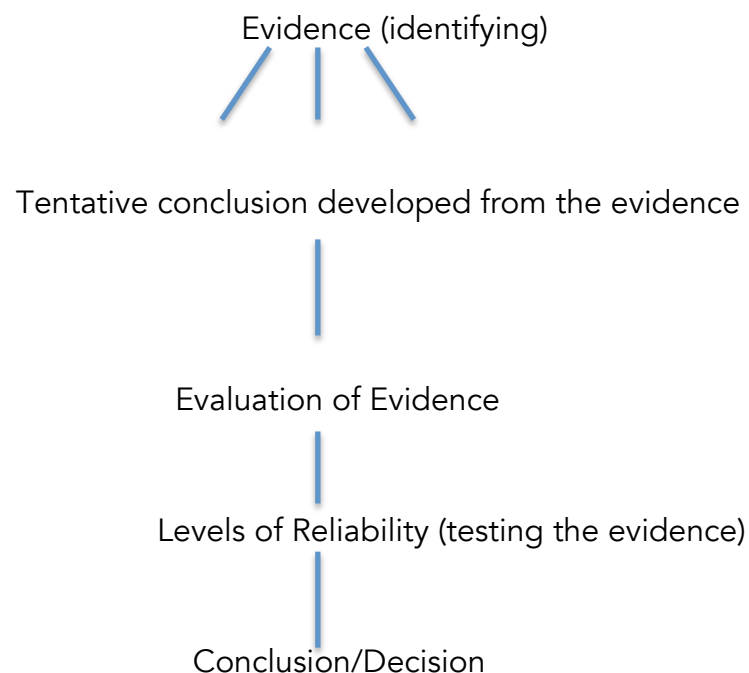
Understanding and applying the information that follows meets the following learning objectives:

- Developing the skills needed to make sense of arguments;
- Evaluating evidence and arguments in a given context;
- Evaluating the worth of arguments.

One of the most complex and essential critical thinking tasks we engage in on a daily basis is inductive reasoning. In any number of daily situations we must identify evidence, evaluate it for reliability, and make a decision or form a conclusion based upon the evidence. This process takes place with anything from as simple as choosing what clothes to wear (work, school, social occasion) to how we deal with a difficult person.

The Inductive Reasoning Process

Adhering to a logical inductive process increases our odds of reaching a reasonable and reliable conclusion about how we should behave given the evidence and circumstances. Inductive reasoning works like this:



The central task of critical thinking is the formation and evaluation of arguments.

In short, we are trying either to devise arguments or assess them. Our goal is two-fold:

- To **demonstrate** that a conclusion is true or reliable through reasoning; and
- To **determine** whether or not a conclusion is true or reliable.

The short story, "The Short Happy Life of Francis Macomber" ends with the character of Wilson forming a conclusion based upon his evaluation of the evidence presented throughout the hunting safari. This story gives us an opportunity to study and form our own reasonable conclusions through inductive reasoning. The following information serves as a guide through that process.

The first concept we need to consider is what is an "inductive process of reasoning"?

The Nature of Inductive Logic

This is the most common form of reasoning we use. Most arguments we hear or engage in are inductive in nature. Inductive reasoning moves in a pattern that goes from evidence--what logicians call "instances" to claim--what logicians call a "conclusion."

An inductive argument has a few notable characteristics:

- Inductive arguments are always open to debate, since evidence can be interpreted in different ways;
- Inductive arguments succeed or fail based upon the quality of the evidence; (fallacies are inductive errors);
- Inductive arguments are most closely tied to Aristotle's *ethos*, *pathos* and *logos* categories because a reliable inductive argument is built upon the credibility of the person making the argument (*ethos*), the person's ability to present the evidence in a meaningful context (*pathos*), and the honest, accurate and specific use of reliable evidence and words (*logos*). Most faulty inductive arguments fail due to problems with either/or *ethos*, *pathos* or *logos*.

Conditions for Formulating a Reliable Inductive Argument

Inductive arguments must meet certain conditions in order to be trusted. At the heart of the evaluation of an inductive argument is a detailed examination of the evidence. In order for an inductive argument to be sound the evidence must be *specific, sufficient, relevant, and accurate*. We must ask these questions when evaluating inductive arguments:

- Is the evidence I am observing or using sufficient to make this claim?
- Is the evidence specific, or is it so general that corroborating evidence is needed?
- Do I need additional evidence that confirms the formulation of this claim?
- Is the evidence being presented relevant to the question at hand?
- Is the evidence accurate? Do I need to check on this evidence before deciding?

Asking these questions helps to counteract the natural human tendency to form generalizations with insufficient evidence. We can rarely get to 100% reliability, but we can move up on the reliability scale (see last page for reliability scale), and we are less likely to make mistakes when we have a solid, logical foundation for formulating reliable conclusions and decision-making. In "The Short Happy Life of Francis Macomber," the safari guide, Wilson, concludes that Margo shoMacomber primarily on the basis of what Wilson observes. Evidence from observers is often the most unreliable form of evidence because people often function from a set of rationalizations that hamper an ability to observe clearly. A person's observations are often influence by the following reactive responses rather than rational thinking:

1. **Mindset**— a "mindset" is a tendency of the human mind to view a situation in a certain way despite contrary evidence. In other words, "don't bother me with the evidence; I have an opinion I wish to maintain."

- Mindsets are dangerous because they encourage us to believe what we want to believe rather than what is so, as the evidence proves. Often, people caught in a mindset will argue that they are being realistic when they are not.
2. **Attitudes**—an “attitude” is a description of a reaction demonstrated when a person is in a persistent state of readiness to react favorably or unfavorably towards a stimulus (such as the government, police officers, lima beans, and so on) no matter what the particular circumstances—it’s when we function from assumptions about people and things instead of thinking about the particulars of the person or thing before us.
- People with an “attitude” are extremely difficult to reason with because they usually have both a mindset and thought habit at work.

Primary Evidence: Observation Statements

OBSERVATION STATEMENTS

There is no more difficult task in critical thinking than evaluating the worth of eye-witness testimony.

Observation statements are propositions/opinions which record or report perceptions. They involve not only the use of our senses but also our interpretation of the sensory data we have gathered.

This happens in two distinct phases in the mind;

1. We become aware of what we are seeing, hearing and so on, and,
2. Then, our minds filtered those experiences through our frame of reference.

It is, therefore, essential that we understand and are cognizant of the elements that make up our frame of reference.

According to critical thinking experts, Moore, McCann and McCann, the term frame of reference is best defined as “the organized body of knowledge, belief, and experience with which we interpret and understand new experiences.” American writer William Faulkner put it somewhat more poetically when he said that with human beings “the past is always present.”

This body of knowledge includes all that we believe or know to be true of the world; what we have experienced in the past and what we believe is likely to happen in the future—it contains our biases as well as our hopes and expectations about the world. No one person's frame of reference is perfect because it is limited and shaped by the fund of experience and knowledge that we have. We all have gaps in our funds of knowledge and because of that our frame of reference can impose some limitations on our ability to reason:

- First, if we have not seen or experienced something in our past, we are less likely to understand its significance or meaning when we first encounter it;
- Second, our sense of what we are comfortable with, based upon our past often limits our ability to reach out and seek new information or experiences.

Whenever, we say that we “observed” something or give evidence to what we have heard, we are filtering it through the limits of that which we already know. It is like a lens, but no one's lens is perfect; all of us look through a somewhat distorted “glass.”

When it comes to observation statements or witness testimony, we must always evaluate not only the statements about what was observed, but also the “lens” through which that person observes. In order to evaluate observation statements more adequately, we must ask 7 key questions that will help us determine the level of reliability (see definition on the next page) we assign to those observation statements.

Seven Questions to Ask about Observation Statements

1. Were the physical conditions favorable for accurate observation?
How close is the observer?
Were there any conditions that hampered observation?
2. Does the observer have the necessary sensory acuity for good observation?
Could the person see and hear well?
Does the person have any physical disabilities that might hamper the ability to observe clearly?
3. Does the observer have the necessary technical knowledge to make a reliable observation?
Someone with a specialization in civil engineering is going to “see” a bridge collapsing differently than the average person observing the same event.

4. Does the person have the necessary objectivity to be trusted? Does the observer have an evident bias or a reason to be biased?

Objectivity=the degree to which a person can observe an event without distortion—this takes in everything from whether the person was paying attention to whether or not the person harbors a bias or prejudice.

5. Does the person remember the events accurately?

This has to do not only with how much time has passed between observation and the formation of an observation statement, but also with how good the person's memory actually is. The philosopher Nietzsche once said, "my memory says that I did it; my pride says that I could not have done it; and in the end my memory yields."

6. Can the observation be corroborated by others?

Did other people observe the event(s) in the same exact way?

Are there other forms of evidence available that might help to substantiate an observation statement?

7. How precise are the details when put in context of the event and any other available evidence?

We often must judge observation statements on the precision and consistency of the details reported through a number of questions and forms of questions.

When trying to determine the reliability of any conclusion inductive conclusion applying the paradigm below is essential—especially in the case of observation statements.

LEVELS OF RELIABILITY SCALE

Below, you will find the basic agreed upon levels or standards by which we evaluate the reliability of evidence. Be aware that this gauge of probability or reliability is more practical than perfect—shades of reliability/probability do exist in between the levels, but this is a useful guide for determining how much to trust a particular observation statement. The gauge moves from highest degree of reliability/probability to the lowest.

- Certain: All doubt is eliminated; the proposition/opinion can be verified to be true;

- True Beyond a Reasonable Doubt: All reasonable doubt is eliminated and the proposition/opinion is almost certain to be true; note that this is the standard our system of justice uses in criminal cases;
- Highly Probable: The weight of the evidence leans strongly towards supporting the proposition/opinion;
- Probable: The weight of the evidence leans towards the proposition/opinion;
- Indifferent: The evidence is equally weighted to both sides; it could go either way;
- Improbable: The evidence leans away from the proposition/opinion;
- Highly Improbable: The evidence leans heavily away from the proposition/opinion;
- False: The evidence proves the proposition/opinion to be untrue.